

[54] **MOVABLE APPARATUS FOR REPLACING  
AN OLD TRACK BY A NEW TRACK**[76] Inventors: **Plasser Erna; Theurer Josef,**  
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Austria[22] Filed: **Apr. 13, 1973**[21] Appl. No.: **350,735**[30] **Foreign Application Priority Data**

May 2, 1972 Austria ..... 3818/72

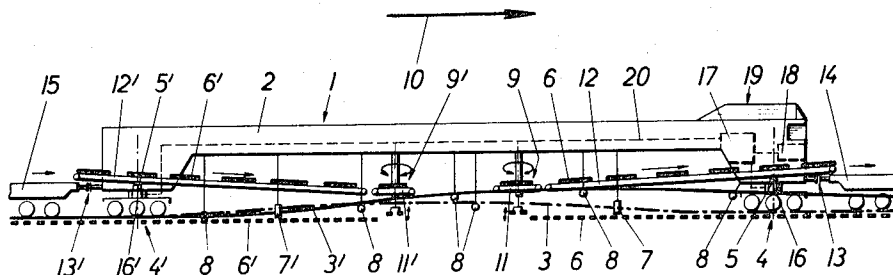
[52] **U.S. Cl.** ..... **104/2**[51] **Int. Cl.** ..... **E01b 29/02**[58] **Field of Search** ..... 104/2, 3, 4, 7, 9, 8[56] **References Cited****UNITED STATES PATENTS**

3,286,648	11/1966	Brosnan .....	104/2
3,330,219	7/1967	Plasser et al. ....	104/2
3,465,687	9/1969	Kerns .....	104/2
3,548,750	12/1970	Hostland .....	104/2

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[57] **ABSTRACT**

An apparatus for the continuous replacement of an old track by a new track comprises a train assembly continuously moving along a right of way during the replacement, the right of way consisting of an old track section, a new track section and an intermediate right of way section wherein the old track is renewed, suitable track removal and laying tools being provided on the train assembly. This assembly consists of a first train section moving on the old track, a second train assembly moving on the new track and, linking the two train sections, an intermediate train section bridging the intermediate right of way section, the intermediate train section having two undercarriages which respectively run on the old and new track sections.

**5 Claims, 2 Drawing Figures**

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FIG. 1

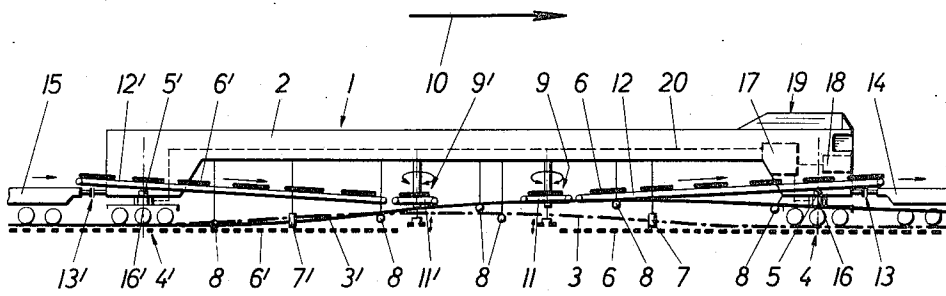
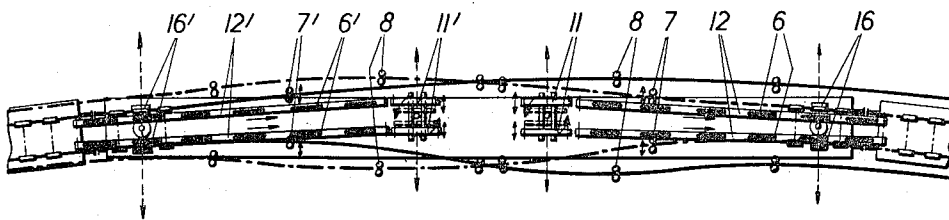


FIG. 2



## MOVABLE APPARATUS FOR REPLACING AN OLD TRACK BY A NEW TRACK

The present invention relates to improvements in apparatus for the continuous replacement of an old track by a new track consisting of track parts including two rails and ties supporting the rails on ballast, which comprises a train assembly continuously moving along a right of way during the replacement, the right of way consisting of a section of old track, a section of new track and an intermediate right of way section wherein the old track is replaced by the new track. The replacement may include only the two track rails or the track rails and ties.

An apparatus of this type has been described and claimed in U.S. Pat. No. 3,699,894, dated Oct. 24, 1972. In this apparatus, the train assembly consists of a first train section moving on the old track rails, a second train section moving on the new track rails and an intermediate train section bridging the intermediate right of way section, means being provided to link the intermediate train section respectively to the first and second train sections to interconnect the same for common movement along the right of way. This apparatus comprises, on the train assembly, means for transporting and supporting at least one of the track parts of the old and new track, means for respectively receiving at least one of the track parts of the old track and laying at least one of the track parts of the new track, the track part receiving and laying means including tools movable in respect of the right of way in a lateral and/or vertical direction, and means for guiding the track rails bridging the intermediate right of way section without substantial friction.

Such an apparatus has made it possible to proceed with track renewal in the manner of a moving assembly line, taking into full consideration the flexing moments to which the rails are subjected under varying operating conditions, particularly in track curves. Apparatus of this type also permits accurate and automatic centering of the track part receiving and laying means in respect of the track axis in tangent as well as curved track sections.

In track renewal operations using apparatus of the above type, a ballast plow and grader has conventionally been used in the intermediate right of way section, sometimes supplemented by a ballast cleaning machine, so as to renew the ballast bed at the same time the track is renewed. This, of course, considerably increases the length of the train assembly, making the apparatus uneconomical in some instances.

It is the primary object of this invention to provide a track renewal apparatus of the indicated type which may be economically used under operating conditions wherein the ballast has previously been cleaned and, if desired, leveled.

This and other objects are accomplished in accordance with the invention by pivotally mounting the intermediate train section on two undercarriages, one of the undercarriages running on the old track section and the other undercarriage running on the new track section. With such an apparatus, the space requirements may be considerably reduced and the entire train assembly may be economically used. It will be particularly useful in a track renewal operation wherein the ballast has been cleaned and leveled beforehand so that the new ties may be laid on a graded ballast bed. Furthermore, such an intermediate train section running

on its own undercarriages may be readily incorporated into the track renewal train assembly, taking fully into account locally changing conditions, such as bridges, overpasses, tunnels and other special types of track sections to be renewed. While increasing the economy and adaptability of the apparatus, the present invention also assures higher accuracy and quality of the track renewal operation.

According to one feature of this invention, the intermediate train section is a single rigid frame and the frame is mounted pivotally on the undercarriages near the respective ends of the frame. Couplings connect the respective frame ends to rail transport cars of the first and second train sections respectively. In this manner, the ends of the intermediate train section is doubly pivotally arranged in the train assembly, which further improves the adaptability of the assembly for use in track curves and the centering of the track receiving and laying tools.

In a preferred embodiment, each undercarriage is a swivel truck with three axles, and hydraulically operated means is mounted in the region of the undercarriages for laterally moving the intermediate train section as a unit in respect of the right of way. Such an arrangement makes it possible to use the apparatus in very narrow curves without encountering any difficulties in the continuous, assembly line track renewal operation.

The intermediate train section may be a self-propellable vehicle having drive and drive control means enabling the vehicle to operate independently of the train assembly. In this way, it may be readily exchanged in the train assembly for adaptation to different operating conditions and may be used independently, being moved from place to place on its own power. This, of course, further increases the economy of the apparatus.

The above and other objects, advantages and features of the invention will become more apparent from the following detailed description of a new preferred embodiment thereof, taken in conjunction with the accompanying drawing wherein

FIG. 1 is a schematic side view of an apparatus according to the present invention and

FIG. 2 is a plan view of the apparatus.

It will be understood that, throughout the specification and claims, the term "new" track and track parts refers only to the fact that these track parts form part of a newly laid track and that such replacement rails and/or ties may, in fact, be used parts.

Referring now to the drawing, the intermediate train section 1 is illustrated as a rigid frame 2 whose one end is mounted on undercarriage 4 constituted by a swivel truck while its other end is mounted on undercarriage 4' also constituted by a swivel truck. Undercarriage 4 runs on rails 3 of the old track section and undercarriage 4' runs on rails 3' of the new track section, the track renewal operation proceeding in the direction of arrow 10.

As shown the swivel trucks 4, 4' have three axles, which assures a good load distribution of the entire weight of the frame 2 pressing on the rails 3, 3' so that neither the old or the new track are subjected to undue loads. It is, of course, possible to use single- or double-axle undercarriages.

A pivotal pin, ball-and-socket joint or like pivot connection 5, 5' mounts the intermediate train section 1 on

its undercarriages, the intermediate section of the right of way, wherein the track is renewed, i.e. the old rail 3 and/or old ties 6 are received and the new rail 3' and/or new ties 6' are laid, extending between the undercarriages 4, 4'. For the purpose of track renewal, means for respectively receiving at least one of the track parts of the old track and laying at least one of the track parts of the new track are mounted on the intermediate track section. These means include tools 7, 7' which are movable laterally and/or vertically in respect of the right of way for receiving the old rails 3 and laying the new rails 3'.

Since more fully disclosed in our U.S. Pat. No. 3,330,219, dated July 11, 1967, and No. 3,521,565, dated July 21, 1970, the track replacement tools are only schematically shown and include means 8, such as guide rollers, for guiding the track rails without substantial friction, the guide rollers being divergently arranged so that the rails are spread apart beyond the track gage in the intermediate section of the right of way to enable the old ties to be taken up and the new ties to be laid without hindrance.

If it is desired to replace the ties as well as the rails, means 9, 9', also well known, are mounted on train section 1 for receiving the old ties 6 and laying new ties 6'.

The track renewal operating cycle proceeds as follows:

After the track rail fastening means have been removed from the old track in a forward section of the train assembly not shown herein, tools 7 mounted behind undercarriage 4 lift the old rails 3 off the ties as the train assembly moves continuously in the direction of arrow 10, and the raised track rails are spread apart, as indicated in FIG. 2. The old rails are then guided without substantial friction along the entire length of intermediate train section 1 by rollers 8, without being permanently deformed. After the intermediate section of the right of way has passed, these old rails 3 may either be laid again in the new track section or they may be loaded on cars forming part of the second train section.

The new rails 3', which may be transported on cars forming part of the first train section or which may be placed next to the old rails, i.e., adjacent the tie ends, are similarly spread in the region of the intermediate right of way section, the new rails being shown in full lines while the old rails are shown in chain-dotted lines.

If the track renewal operation also involves a renewal of the ties, the loose old ties 6 in the intermediate section of the right of way are lifted and removed by tools 9 arranged to take up pairs of adjacent ties and to pivot them 90° in the region of the spread rails so that the old ties are positioned parallel to the right of way. After the old ties have been turned, they are lifted above the level of the pair of conveyor bands 11, 11'. The conveyor bands are then inwardly moved in a transverse direction until they are aligned with the old ties, whereupon tools 9 are opened and deposit the ties on the conveyors. The two conveyors are then moved apart again to their original position adjacent the rails to convey the ties to the two elongated conveyors 12 which transport the ties to cars provided in the train assembly for storing the old ties.

Immediately after the old ties have been removed, a like apparatus 9' lays new ties 6' brought to the inter-

mediate section of the right of way by elongated conveyors 12' which move the new ties into laterally adjustable conveyor bands 11' which bring them into the reach of tools 9' turning the new ties 90° to lay them at desired crib spacings.

The two elongated tie conveyors 12, 12' are pivotally mounted about a vertical axis in the region of the pivots 5, 5' for the undercarriages, 4, 4' to assure an accurate transfer of the ties from conveyor bands 11, 11' to conveyors 12, 12' in track curves.

After the new ties have been laid, the new rails 3' are laid thereon by means of tools 7' and the newly laid rails are fastened at the desired gage on the new ties in any suitable manner (not shown).

As illustrated, conventional couplings 13, 13' link the ends of the intermediate train section 1 to adjacent cars 14 and 15 of the first and second train sections so that all three train sections are interconnected for common movement along the right of way. The pivotal connection 5, 5' between the undercarriages 4, 4' and the frame 1, together with the pivotal connection 13, 13' between the frame and the adjacent train sections, assures a proper positioning of the track renewal tools 7, 7', 9, 9' in respect of the right of way, particularly in curves.

This adaptation of the apparatus to various track shapes is further improved and the apparatus is made universally adaptable also for track curves with small radius by providing a hydraulic motor 16, 16' in the region of the pivots, 5, 5' for moving the entire frame 1 transversely of the right of way. In this way, the track renewal tools will always be accurately centered. It would also be possible to mount the track renewal tools themselves for transverse movement.

The cars 14, 15 may take various forms. Thus, car 14 may be used to transport old ties and new rails, and car 15 may be used to transport new ties and the old rails. It is also possible, however, to use the car 15 only for the old rails while succeeding cars are used to transport the old and the new ties while the car 14 is used to house the drive and drive control for the intermediate train section 1.

In the illustrated embodiment, the train section 1 is self-propellable to make it universally useful, carrying its own drive 17 and drive control 18. In this manner, the train section 1 may be used independently, for instance if only the rails are to be replaced, and/or it may be inserted into a variety of train assemblies for track renewal. Therefore, it is useful to equip the intermediate train section 1 with its own operating stand 19 which houses the drive 17 and controls 18. As schematically shown in FIG. 1, control lines 20 lead from the operating stand to the track renewal tools 7, 7', 9, 9' and to the hydraulic motors 16, 16'.

It will be obvious from the above description of the structure and function of the intermediate train section according to the present invention that it may be used advantageously for the replacement of rails as well as for the simultaneous replacement of the ties and rails in all cases where the ballast bed has been previously prepared, i.e., leveled and, if desired, cleaned, any ballast required to fill the cribs after the track renewal being stored on the shoulders. The universal adaptability of the intermediate train section is enhanced by the two pivotal connections between this section and the two other sections of the train assembly.

While the invention has been described and illustrated in connection with a preferred embodiment, it will be clearly understood that many modifications and variations may occur to those skilled in the art, particularly after benefiting from the present teaching. More particularly, for instance, the intermediate train section may be inserted at any desired point in the train assembly.

We claim:

1. An apparatus for the continuous replacement of an old track by a new track consisting of track parts including two rails and ties supporting the rails on ballast, comprising a train assembly continuously moving along a right of way during the replacement, the right of way consisting of a section of old track, a section of new track and an intermediate right of way section wherein the old track is replaced by the new track, the train assembly consisting of

1. a first train section moving on the old track rails,
2. a second train section moving on the new track rails and
3. an intermediate train section bridging the intermediate right of way section,
  - a. two undercarriages whereon the intermediate train section is mounted, one of the undercarriages running on the old track section and the other undercarriage running on the new track section, and
  - b. means linking the intermediate train section respectively to the first and second train sections to interconnect the same for common movement

along the right of way, and the apparatus further comprising on the train assembly

4. means for transporting and supporting at least one of the track parts of the old and new tracks,
5. means for respectively receiving at least one of the track parts of the old track and laying at least one of the track parts of the new track,
  - a. the track part receiving and laying means including tools movable in respect of the right of way, and
6. means for guiding the track rails bridging the intermediate right of way section without substantial friction.

2. The apparatus of claim 1, wherein the intermediate train section is a single rigid frame, the frame being mounted pivotally on the undercarriages near the respective ends of the frame, and the linking means being couplings connecting the respective frame ends to rail transport cars of the first and second train sections respectively.

3. The apparatus of claim 2, wherein each of the undercarriages has three axles.

4. The apparatus of claim 1, further comprising hydraulically operated means in the region of the undercarriages for laterally moving the intermediate train section as a unit in respect of the right of way.

5. The apparatus of claim 1, wherein the intermediate train section is a self-propellable vehicle having drive and drive control means enabling the vehicle to operate independently of the train assembly.

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UNITED STATES PATENT OFFICE  
CERTIFICATE OF CORRECTION

PATENT NO. : 3,807,310

DATED : April 30, 1974

INVENTOR(S) : Franz Plasser, deceased, by Erna Plasser et al

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

At 19, change "Erna" to --Plasser, deceased--

At 76, change "Plasser Erna; Theurer Josef" to --Franz Plasser, deceased, late of Johannesgasse 3, Vienna, Austria A-1010, by said Erna Plasser, heir; Josef Theurer--

Signed and Sealed this

Twentieth Day of July 1976

[SEAL]

Attest:

RUTH C. MASON  
Attesting Officer

C. MARSHALL DANN  
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